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BRIEF COMMUNICATION

A MAJOR RANGE EXTENSION AND NEW ECOLOGICAL DATA ON *OXYURANUS MICROLEPIDOTUS* (REPTILIA: ELAPIDAE)

The Inland Taipan (*Oxyuranus microlepidotus*) is a large elapid snake endemic to Australia. Considering both venom toxicity and average venom yield per bite, *O. microlepidotus* is the world's most dangerous snake[1]. Despite its size and medical and scientific significance, the status and distribution of this snake, have been difficult to ascertain. After being described in 1879, *O. microlepidotus* was not found again until 1974[2]. Following its rediscovery, it has been recorded from the channel country of the Cooper Creek and Georgina and Diamantina Rivers of south-western Queensland and north-eastern South Australia[2]. *O. microlepidotus* is a rarely seen snake because most of its life is spent in rat burrows[3].

In April 1992, a large elapid was collected on the Coober Pedy to William Creek Road (29°03'S, 135°03'E) (Fig. 1) by local contractor Jeff Boland. He recognised that the snake was different from the Western Brown (*Pseudonaja nuchalis*) and Mulga Snake (*Pseudechis australis*) with which he was very familiar. Jeff Boland subsequently collected a sloughed skin from the Moon Plain (28°52'S, 134°50'E) (Fig. 1) and sent both the specimen and the slough to the author.

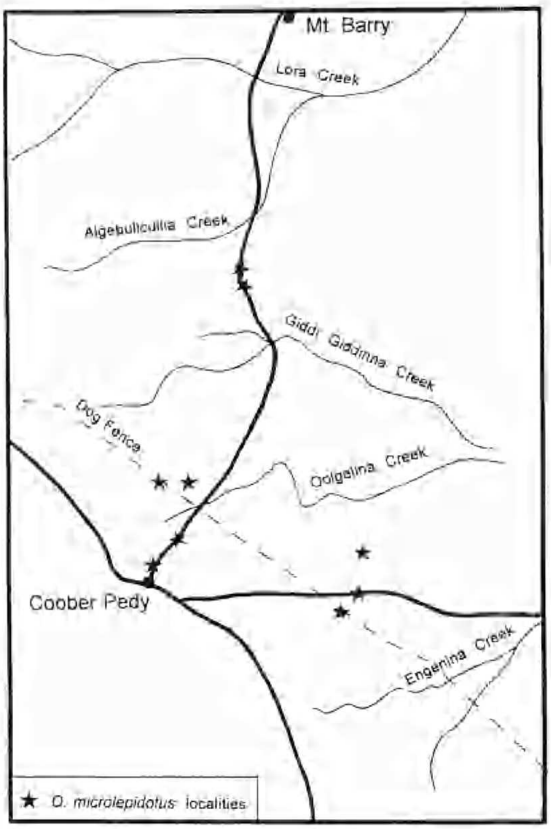

Fig. 1. New records of *Oxyuranus microlepidotus* in the Coober Pedy region.

The dorsal scales of the specimen were uniformly dark brown with the head nearly black. The specimen and the slough had 23 mid-body scale rows and a single anal scale. These characteristics enabled the snake and the slough to be confidently identified as *O. microlepidotus*. The scalation of the Coober Pedy specimen closely matched that of *O. microlepidotus* specimens from Moomba except that rather than the lower primary temporal scale extending to the lip between the 5th and 6th labials, this scale had fused with the 6th labial in the Coober Pedy specimen. Inspection of other specimens in the South Australian Museum indicates that the status of the lower primary temporal scale is considerably plastic in *O. microlepidotus*.

O. microlepidotus can be further distinguished from the sympatric, and highly variable *P. nuchalis* in having a longer head, smaller and more numerous nuchal scales, a pronounced canthus and plain ventral scales as distinct from spotted or dark edged ventral scales in *P. nuchalis*. In addition, most *P. nuchalis* from within the range of the *O. microlepidotus* exhibit irregular black spots or black crossbands, whereas these bands were absent from the Coober Pedy and Moomba specimens of the *O. microlepidotus*.

In the winter of 1992, two road-killed *O. microlepidotus* were found on the Coober Pedy to Mt Barry Road (28°34'S, 134°54'E, 28°33'S, 134°55'E [SAM R40464]), a live specimen was sighted on the Dingo Fence four kilometres south of the original locality (29°05'S, 135°03'E) and a further specimen was killed at Tom Cat Hill (29°00'S, 134°45'E) in Coober Pedy (Fig. 1). A further road killed specimen was located on the Coober Pedy to Mt Barry Road (28°57'S, 134°47'E [SAM R42484]) in September 1993. South Australian Museum records are denoted by the prefix SAM. On September 6, 1993 a live *O. microlepidotus* was captured by Jeff Boland on the Moon Plain, adjacent to the Breakaways Reserve. The following week a road killed specimen (29°00'S, 135°10'E) was collected approximately 40 km east of Coober Pedy.

The live specimen was captured in the rain with a strong wind blowing and a recorded temperature at Coober Pedy of only 15°C. This snake was uniformly black on the dorsal surface with a white, unmarked ventral surface. One month after its capture the snake sloughed, revealing a yellowish belly and a dark brown dorsal surface with black edges to some scales producing a slight herring-bone pattern. The head remained a glossy black colour following the slough.

The *O. microlepidotus* from Coober Pedy region were about 500 km from the nearest known *O. microlepidotus* locality at Goyder Lagoon, in north-eastern South Australia. The Coober Pedy population of *O. microlepidotus* is separated from that of the channel country by the huge salina of Lake Eyre and the dunefields of the Simpson Desert. The discovery of *O. microlepidotus* near Coober Pedy is highly significant as it represents the first known occurrence of the species near a considerable population centre and also raises the possibility of a much more expanded range than previously recognised for this important snake.

The Coober Pedy specimens of *O. microlepidotus* were found from April-September. Interestingly, the Goyder Lagoon population of *O. microlepidotus* has been recorded predominantly in March and April[4,5] whereas Covacevich[3] reports that *O. microlepidotus* only emerges for 2-3 weeks in late winter-early spring. Although Covacevich[3] indicates that *O. microlepidotus* are predominantly active on still days, Mirtschin[5] collected several individuals on windy days. The capture of the specimen near the Breakaways Reserve on a cold, wet, windy day indicates that these snakes may be encountered at any time throughout autumn, winter and spring. *O. microlepidotus* are possibly also active in cracks and mammal holes during the warmer months but are not recorded because they do not need to come to the surface to bask.

O. microlepidotus records from the Coober Pedy region were found in two different habitats. Five of the records were from cracking gypseous soils. Four of these records were from a large area of gypseous soils known as the Moon Plain. These soils support little or no perennial vegetation. Cover and species diversity of annual vegetation vary dramatically depending on the season. The dominant, albeit sparse, vegetation during October 1992 consisted of *Atriplex spongiosa, Salsola kali, Helipterum floribundum, Enolaena lepidolepis, Arabidella nasturtium* and the grasses *Enneapogon polyphyllus, Panicum decompositum, Aristida anthoxanthoides, Astrebla pectinata, Eragrostis setifolia* and *E. dielsii*. Vegetation cover was greatest in the small run-on areas in the undulating plain. These low lying areas were also the most heavily cracked.

Two other records were from gibber country dominated by the Oodnadatta Saltbush *Atriplex nummularia*. Other common plants included *Sclerolaena intricata, Atriplex spongiosa, Sarcostema* and *Salsola kali*. Small gilgai depressions within this habitat contained cracking clay and were vegetated with several grass and daisy species.

The plains country around Coober Pedy is very heterogeneous and the two habitats described above often form a mosaic with the gibber more common on high ground and the gypseous soils usually in low lying country. Therefore snakes in this region may depend upon, or prefer, either habitat and yet be recorded crossing between areas of favoured habitat.

The cracking gypseous soil habitat is very similar to the preferred habitat described for *O. microlepidotus* at Clifton Hills, South Australia[4] and in Queensland[6] although they have also been recorded from gibber plains and sand dunes[5]. These cracking plains therefore appear to be the key habitat for the *O. microlepidotus*. The cracking gypseous plains are quite widespread near the south-west margin of the Lake Eyre Basin and are often associated with run off zones from breakaway country. These plains are often inter-connected by creeks which possibly also provide appropriate habitat.

Interestingly the Moon Plain and surrounding gypseous regions were not identified as potential sites for *O. microlepidotus* based on climatic indices[7]. Habitat and biological indices, rather than climatic variables may therefore be more important than climate in determining the range of *O. microlepidotus*.

The eastern population of *O. microlepidotus* feeds extensively on the Long-haired Rat (*Rattus villosissimus*) with which its ecology and distribution have been inextricably linked[2]. The evolution of a large size, a rapid snap-release bite and extremely potent venom in *O. microlepidotus* is believed to be a response to their predation on mammals which can defend themselves by biting savagely[1]. Therefore, particular emphasis was placed on searching for *R. villosissimus* or other similar sized mammals in the Coober Pedy region, to predict the potential range of *O. microlepidotus*.

Field surveys were conducted during 1992-1993 in cracking clay regions adjacent to the *O. microlepidotus* records on Mt Barry, Anna Creek, Billa Kalina and Stuart Creek Stations to ascertain whether *O. microlepidotus*, or their prey species, occupied a more extensive range. The striking feature of the cracked gypseous soil localities was the diversity of mammals and paucity of reptiles. Of particular note was the presence of Plains Rats (*Pseudomys australis*). Although *R. villosissimus* reached the Coober Pedy region in 1973-74 (J. Boland, K. Greenfield pers. comm.) they do not appear to inhabit the region normally and were not recorded in this survey. *P. australis*, Forrest's mice (*Leggadina forresti*), Desert Mice (*Pseudomys desertor*), House Mice (*Mus domesticus*), Paucident Planigales (*Planigale gilesii*) and Dunnarts (*Sminthopsis macroura, S. crassicaudata*) were located over a wide range. Mammal densities were higher in the cracking gypseous soils than in other habitats in the region[8]. While the adult *O. microlepidotus* probably feed predominantly on *P. australis, L. forresti* and the occasional bird, juvenile snakes could feed on *P. gilesii* and *M. domesticus*.

Because eight confirmed records now exist from different localities, initial suspicions that the specimens represented snakes that were artificially translocated from their original range can probably be discounted. However, it is not known whether this apparent range expansion is a recent phenomenon, facilitated by mobility of the north-eastern population, or whether *O. microlepidotus* have occupied the plains around Coober Pedy for a long period. Considering the dependence on the *R. villosissimus* in the channel country, a potential scenario is that the *O. microlepidotus* followed the rats from north-eastern South Australia through to Coober Pedy during the rat plague of 1976. It is unlikely, however, that *O. microlepidotus* could have expanded its range by over 400 km during the course of a single rat plague. A more feasible explanation is that *O. microlepidotus* have always inhabited the gypseous plains around the south-western margin of the Lake Eyre basin but the sparseness of the human population combined with the predominantly underground habit of the snake have accounted for the paucity of records. These same factors probably explain why *O. microlepidotus* eluded discovery in the Birdsville region for so long. Increased snake numbers as a result of large mammal populations which have responded to good seasons, combined with increased vigilance and awareness of local residents probably explain why the *O. microlepidotus* was discovered in the region in 1992. A continued interest in this species is predicted to result in the discovery of *O. microlepidotus* over a broader range in cracky gypseous country to the south and west of Lake Eyre.

This paper is dedicated to Jeff Boland whose interest and awareness resulted in the discovery of *O. microlepidotus* near Coober Pedy. Thanks also go to Mick and Ben Evans, Greg Stagbouer, Peter Paisley, Bec Mussared, Katherine Moseby, Steve and Tania Green, John Fewster and Zoe Bowen for assistance with field work and to Mark Hutchinson, Jeanette Covacevich and Peter Mirtschin for help in the preparation of this paper. Frank Badman assisted with plant identification.

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